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of the International Cloud Work for the United States,' *American Journal of Science*, December, 1899, 433-444. A preliminary statement of results which are soon to be published *in extenso* by the Weather Bureau.

OLIVER L. FASSIG: 'Types of March Weather in the United States,' *American Journal of Science*, November, 1899, 319-340. A discussion of the relations existing between the mean atmospheric pressure, the prevailing character of the weather and the paths of storms.

WILLIS L. MOORE: 'Report of the Chief of the Weather Bureau for 1899,' U. S. Department of Agriculture, Weather Bureau. 8vo. Washington, D. C., 1899. Pp. 23.

B. S. PAGUE: 'The Mild Temperature of the Pacific Northwest, and the Influence of the Kuro Siwo.' 8vo. Portland, Ore., 1899. Pp. 11. Charts III. The author classifies the temperature conditions of the north Pacific Coast into continental, dynamic and oceanic types. He believes that dynamic heating of descending air is more effective than the influence of the ocean in producing the mild winter temperatures of the Pacific Northwest.

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RECENT ZOOPALEONTOLOGY.

Adaptive radiation of the Camels and Llamas.—Professor Scott advances the following hypothesis in his recent important memoir:

"The most interesting and striking result to which the study of the Uinta selenodonts has led is the very unexpected conclusion that, with the possible exception of the *oreodonts* and *agriocherids*, all of the strictly indigenous North American *selenodonts* are derivatives of the tylopodan stem. Paradoxical as this conclusion may appear, I believe it to be fully justified by the evidence which will be laid before the reader. The Tylopoda are thus seen to be a very ancient and highly diversified group, comparable in this respect to the Pecora, or true ruminants, which they so closely resemble in many features. The Pecora are an Old World group, which underwent great expansion and diversifications in Eurasia, but did not reach this continent till late Miocene times, and never attained the importance

here that they have so long had in the Eastern Hemisphere. Their place was, to a very great extent, taken in America by the Tylopoda, which ran a course of development in many ways parallel to that of the Pecora and Tragulina, but with a variety and diversity of structure, habit, and appearance, such as are not attained in either of the latter groups." It has long been known that the Camels and Llamas had their home on this Continent, but Professor Scott's hypothesis, that practically all the American Artiodactyls, except the pigs, sprang from a common cameloid stem, is of the greatest interest. If confirmed, it will take rank as a brilliant generalization resulting from recent exploration. Even if not confirmed, it will be of great value as stimulating closer inquiry into the natural relationships of the American even-toed Ungulates. *Trans. Wagner Free Institute*, Phila., May, 1899, Vol. VI.

The Pliocene Hyrax.—*Pliohyrax* Osborn is identical with *Leptodon* Gaudry. This rather dry announcement relates to an interesting extension of our knowledge of the Hyracoidea. For some years a skull found upon the Island of Samos awaited description in the Stuttgart Museum; Professor Fraas kindly placed it in the hands of Professor Osborn, who described it before the International Zoological Congress, at Cambridge, as a new and very remarkable form of *Hyrax* from the Lower Pliocene, as the only fossil representative of this order and as belonging to a distinct family of Pliohyracidae and a distinct genus *Pliohyrax krupii*. It now appears that the lower jaw found by Professor Gaudry in Pikermi, Greece, and long known as *Leptodon graecus* belongs to the same type as the above. Dr. Max Schlosser, of Munich, points this out in an interesting article in the *Zoologischen Anzeiger* of October. He leaves the animal among the Hyracoids and suggests that it is of South American origin, a suggestion of considerable probability and of very great interest.

Exploration for Dinosaurs.—Great activity prevailed last season in the search for the remains of Dinosaurs. A report of the parties exploring in the Dinosaur beds under the direction of Professor W. C. Knight has already been made in this JOURNAL. In addition to

the scattered fossils thus secured by representatives of many institutions, there were five fixed parties in the field. The three representing the Field Columbian Museum, the University of Wyoming, and the University of Kansas had their quarries in the Freeze Out Mountains. A few miles to the east was the Carnegie Museum party under the direction of Dr. Wortman; they found a very promising locality in which a large portion of a skeleton of *Diplodocus* was secured. To the southeast was the American Museum party, which continued the excavation of the 'Bone Cabin Quarry' with good results, and four miles west of this point secured a considerable part of a *Brontosaurus* skeleton. In the quarry itself the greater portion of a *Mososaurus* skeleton was found in a very much crushed condition. Altogether the general work of the season will greatly advance our knowledge of the Dinosaurs. At the same time the beds in the Como region have been so thoroughly explored that it is becoming very difficult to find these animals, and when found it is very difficult to take them out.

Ear bones of Marsupials.—According to Richard Weil,* the ossicula auditus of the opossum are not at all parallel in their development with those of the pig, considered as a representative of the Placental mammals. This tends further to confirm the conclusion, arrived at from many other grounds, that Marsupials are entirely to be regarded as forms parallel to the Placentals rather than as ancestral forms. As regards the origin of the malleus, Weil's investigation confirms the prevailing opinion that it is derived from Meckel's cartilage or the mandibular arch. The incus also arises from the mandibular arch and has no relation to the hyoidean arch. Mr. Weil believes that Kingsley has placed too much dependence upon the relation of the nerves to these elements. Weil's results directly contradict the theory of Reichert, Huxley and others, that the quadrate of the *Sauropsida* is represented in the auditory chain of Mammals, for according to his observations the quadrate belongs not to the mandibular arch

from which the Mammals derive their ear bones but to the palatoquadrate bar.

The Fins of Ichthyosaurus.—Professor Fraas, of Stuttgart, describes the most perfect specimen of an *Ichthyosaurus* which has yet been found in the famous quarry in Holzmaden. It exhibits in a remarkable manner the structure of the fins, having been worked out with the utmost care by Herr Bernhard Hauff for the Royal Geological Museum of Hungary. Although partly described by Owen, the complete dermal structures of *Ichthyosaurs* were first discovered in the Holzmaden quarry in 1892. Five specimens have been found altogether in a somewhat restricted part of the quarry. The skin impressions are of a light brown to a deep black color with a grayish slate background, and are so fine that they must be exposed with the greatest skill by the use of a fine scapel working under a magnifying lens. The specimen here described gives a perfect picture of the dorsal and caudal fins and of the fin folds surrounding the paddles. The irregular folds behind the dorsal fin represent a displacement of a portion of the pigmented skin from the sides of the body. The caudal fin is remarkable in the elongation of its upper lobe, but it is not at all evident how this lobe was supported, since, unlike the sharks, the tail vertebræ turn down into the lower lobe.

H. F. O.

AGRICULTURAL EXPERIMENT STATIONS.*

THE most obvious indication of the success of experiment stations as a means for improving agricultural conditions in this country is the steady increase in the number of stations and station officers, and in the amount of financial support which they have received from the National and State governments. In the first volume of the *Record* it is stated that in 1889 there were 46 stations in the United States, receiving an aggregate revenue of about \$725,000, of which \$600,000 was appropriated from the National Treasury and \$125,000 was received from State governments and other local sources. The total number of persons engaged in the work of the stations and at this office that year was 402. In 1898, the last year for which statistics have been compiled, the total number

* *Annals N. Y. Acad. Sci.*, Vol. XII., No. 5. Pp. 103 to 118, July 7, 1899. 'Development of the ossicula auditus in the opossum.'

* From *Experimental Station Record*.